

REMARKS

Claims 1-5 and 7-26 are pending; claims 9-26 have been withdrawn from consideration; claims 1, 3, 4, 7 and 8 are rejected; claims 2 and 5 are objected to.

After entry of the amendment, claims 3, 4 and 7 will have been cancelled and claims 1, 2, 5 and 8-26 will be pending.

Claim 1 has been amended to incorporate the subject matter of claim 7, and to recite the genus and species of the organism (*Nicotiana tabacum*) from which the polypeptides recited in the claim are derived. Support for the amendment may be found in claim 7 and at page 3, lines 2-4, of the specification.

Claim 8 has been amended to correct an obvious misspelling in the chemical name of the pyrazole compound recited in the claim. Support for the correction may be found in specification at page 6, lines 1-2.

No new matter has been added. Entry of the amendment is respectfully requested.

I. Rejection of Claims Under 35 U.S.C. §112

A. At paragraph 2 of the Office Action, claims 3 and 4 are rejected under 35 U.S.C. §112, second paragraph, as being indefinite.

Applicants note that included herewith is an amendment to the claims, directing the cancellation of rejected claims 3 and 4, thus rendering the present rejection moot.

B. At paragraph 4 of the Office Action, claim 4 are rejected under 35 U.S.C. §112, second paragraph, as being indefinite.

Applicants again note that included herewith is an amendment to the claims, directing the cancellation of rejected claim 4, thus rendering the present rejection is moot.

C. At paragraph 5 of the Office Action, claims 1-5, 7 and 8 are rejected under 35 U.S.C. §112, first paragraph, as lacking adequate written description.

The Examiner states that the claims recite the limitation “tolerance to pyrazole compounds,” and that Applicants point to pages 24 and 25 for support of this limitation. The Examiner contends that there is only support for a mutated peptide having resistance to the pyrazole compounds listed in claim 7, and not tolerance to all pyrazole compounds equivalent to that of SEQ ID NO:2. Therefore, the Examiner considers the limitation new matter.

In response, Applicants note that included herewith is an amendment to the claims wherein the pyrazole compounds recited in claim 7 have been incorporated into claim 1 (and claim 7 is cancelled). Thus, claim 1 now recites the specific pyrazole compounds said by the Examiner to be supported in the application.

In view of the amendment to the claims, Applicants assert that each of the claims has adequate written description support in the specification, and therefore respectfully request reconsideration and withdrawal of this rejection.

D. At paragraph 6 of the Office Action, the rejection of claims 1, 3, 7 and 8 under 35 U.S.C. §112, first paragraph, as lacking adequate written description is maintained.

The Examiner refers to the basis for the rejection set forth in the previous Office Action (dated August 21, 2001). The Examiner continues to assert that while the claims recite a broad genus of proteins (all protox polypeptides tolerant to photobleaching herbicides and a tolerance to pyrazole compounds), the specification fails to provide a sufficient description of the claimed genus of proteins as it merely describes the functional features of the genus without providing any definition of the structural features of the species in the genus.

In response, claim 1 has been amended to recite the specific pyrazole compounds to which the proteins of the present invention have tolerance. Furthermore, claim 1 has been amended to recite the organism from which all the proteins are isolated (*Nicotiana tabacum*). As a result, the claims encompass only those proteins (1) derived from one organism, (2) having a specific activity, and (3) having resistance to a specific group of chemical compounds, and mutants thereof. Thus, the claims are limited to a very small group of proteins that have adequate written description support in the specification.

Furthermore, a discussion of the types of mutations that may be made to the mutant peptide is found at page 4, lines 10-16, of the specification.

Accordingly, Applicants respectfully request reconsideration and withdrawal of this rejection.

E. At paragraph 7 of the Office Action, the rejection of claims 1, 3, 7 and 8 under 35 U.S.C. §112, first paragraph, as lacking enablement is maintained.

The Examiner again refers to the basis for the rejection set forth in the previous Office Action (dated August 21, 2001). The Examiner continues to assert that the scope of the claimed protox polypeptides is not commensurate with the enablement provided by the instant specification, which provides enablement only for the protox polypeptide of SEQ ID NO:2.

In response, Applicants again note that the claims have been amended, as discussed above, such that the scope of the claims encompasses only those proteins (1) derived from one organism, (2) with specific activity, and (3) with resistance to specific group of chemical compounds, and mutants thereof.

Furthermore, the teachings of the present specification provide methods for creating expression vectors containing a polynucleotide encoding a protein of the present invention (pages 7-10, 18-19), for transforming it into a plant (pages 10, 26-27), and achieving expression of the gene encoded by the polynucleotide in a plant (pages 10, 27). The specification also provides methods for screening plants expressing the gene to determine their level of activity, and whether they encoded a protein that would be encompassed with the scope of the claims (pages 27-28).

In view of the narrow scope of the claims, and the teachings provided in the specification, Applicants assert that there is sufficient guidance in the specification such that a skilled artisan would be able to practice the claimed invention as recited without undue experimentation.

Accordingly, Applicants respectfully request reconsideration and withdrawal of this rejection.

II. Rejection of Claims Under 35 U.S.C. §102

A. At paragraph 8 of the Office Action, the rejection of claims 1, 3, 7 and 8 under 35 U.S.C. §102(b), over Ward et al., is maintained.

The Examiner again refers to the basis for the rejection set forth in the previous Office Action (dated August 21, 2001). In response to Applicants' arguments against the rejection, the Examiner states that while Applicants argue that the protox polypeptides of the present invention are distinct from those of Ward et al., in that Ward et al. does not teach *N. tabacum* protox polypeptides, and the degree of herbicide resistance of the claimed proteins is much greater than that of Ward et al., neither such limitation is recited in the claims.

In response, Applicants note that the protox polypeptides of Ward et al. are isolated from *Arabidopsis thaliana* and *Z. may*. Ward et al. does not teach a protox polypeptide from *Nicotiana tabacum*. Applicants further note that claim 1 has been amended to limit the polypeptides of the present invention to those derived from *Nicotiana tabacum*.

Furthermore, the resistance mutation in the polypeptides of the present invention result in a more than 10 fold increase in resistance, as compared with the R/S ratio in *Arabidopsis thaliana* (please see Table 6, at page 25 of the specification).

Thus, Applicants assert, the teachings of Ward et al. do not teach each element of the claimed invention, and therefore Ward et al. does not anticipate the present invention.

Accordingly, Applicants respectfully request reconsideration and withdrawal of this rejection.

B. At paragraph 9 of the Office Action, the rejection of claims 1, 3 and 6 under 35 U.S.C. §102(e), over Volrath et al., is maintained.

The Examiner again refers to the basis for the rejection set forth in the previous Office Action (dated August 21, 2001). In response to Applicants' arguments against the rejection, the Examiner states that while Applicants argue that the protox polypeptides of the present invention are distinct from those of Volrath et al. in that Volrath et al. does not teach protox polypeptides having an enzyme activity equivalent to SEQ ID NO:2, this limitation is not recited in the claims.

In response, Applicants have amended claim 1 to state that the mutant peptides of the claim have "an enzyme activity equivalent to that of said protoporphyrinogen oxidase." Thus, all protox polypeptides encompassed within the claim must have an enzyme activity equivalent to the polypeptide of SEQ ID NO:2. As Volrath et al. does not teach a protox enzyme having an

enzyme activity substantially equivalent to the polypeptide of SEQ ID NO:2, it does not anticipate the present invention.

As discussed in the amendment filed February 12, 2002, Applicants provide experimental evidence directly measuring protox enzyme activity (Table 4). Applicants further disclose data using a variety of herbicide compounds and concentrations (Table 6). Although Volrath et al. describes the screening of transformed bacterial colonies and selecting for growth on agar in the presence of herbicide, there is nothing in Volrath et al. to suggest that any of the peptides in Volrath et al. is equivalent to the protox peptide of SEQ ID NO:2.

In view of these points, it is clear that the disclosure of Volrath et al. does not anticipate the claims of the instant application, and Applicants therefore respectfully request reconsideration and withdrawal of this rejection.

III. Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

AMENDMENT UNDER 37 C.F.R. §1.116
U.S. Appln. No. 09/508,418

Q58140

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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APPENDIX
VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

Claims 3, 4 and 7 are canceled.

The claims are amended as follows:

1. (Twice amended) An isolated protoporphyrinogen oxidase from *Nicotiana tabacum*, and derivatives thereof, tolerant to photobleaching herbicide ~~and derivatives thereof~~, comprising a polypeptide having the amino acid sequence represented by SEQ ID NO:2 or a mutated peptide having deletion, addition, or substitution, ~~etc.~~ of one or more amino acids in the above amino acid sequence and having (1) an enzyme activity equivalent to that of said protoporphyrinogen oxidase and (2) tolerance to photobleaching herbicide pyrazole compounds equivalent to that of said protoporphyrinogen oxidase, ~~tolerant to photobleaching herbicide~~ wherein said photobleaching herbicide is a pyrazole compound selected from the group consisting of ethyl 2-chloro-5-(4-chloro-5-difluoromethoxy-1-methyl-1H-pyrazole-3-yl)-4-fluorophenoxyacetate, ethyl 2-[5-(4-chloro-5-difluoromethoxy-1-methyl-1H-pyrazole-3-yl)-2,4-dichlorophenylamino]propionate, 4-chloro-3-[4-chloro-2-fluoro-5-methoxyphenyl]-5-difluoromethoxy-1-methyl-1H-pyrazole, 4-chloro-3-[4-chloro-2-fluoro-5-(2-propynyl)oxyphenyl]-5-difluoromethoxy-1-methyl-1H-pyrazole, ethyl 2-[2-chloro-5-(4-chloro-5-difluoromethoxy-1-methyl-1H-pyrazole-3-yl)-4-fluorophenoxy]propionate, 1-methylethyl 5-[4-bromo-1-methyl-5-(trifluoromethyl)-1H-pyrazole-3-yl]-2-chloro-4-benzoate, and 4-chloro-3-(4-chloro-2-fluorophenyl)-5-difluoromethoxy-1-methyl-1H-pyrazole.

2. (Previously amended) The isolated protoporphyrinogen oxidase tolerant to photobleaching herbicide and derivatives thereof of claim 1, comprising a polypeptide having the amino acid sequence represented by SEQ ID NO:2, wherein one or more amino acids is deleted and the polypeptide has an enzyme activity equivalent to that of said protoporphyrinogen oxidase tolerant to photobleaching herbicide.

5. (Previously amended) The isolated protoporphyrinogen oxidase of claim 1, comprising an amino acid sequence represented by SEQ ID NO:2.

8. (Twice amended) The isolated protoporphyrinogen oxidase according to claim 17, wherein the photobleaching herbicide is ethyl 2-chloro-5-(4-chloro-5-difluoromethoxy-1-methyl-1H-pyrazole-3-yl)-4-~~fluorophenoxyacetate~~fluorophenoxyacetate.